DOCUMENT RESUME

ED 226 563 EC 151 058

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TITLE Cognitive-Behavioral Modification with Hyperactive/Attention Deficit Disorder Children.
PUB DATE Aug 82
NOTE 32p.; Paper presented at the Annual Convention of the American Psychological Association (90th, Washington, DC, August 23-27, 1982).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Attention; Behavior Change; *Behavior Modification; Elementary Education; Exceptional Child Research; *Hyperactivity; *Self Control
IDENTIFIERS *Attention Deficit Disorder

ABSTRACT

Cognitive-behavior modification (CBM) procedures were taught to special education teachers and elementary school guidance counselors who then administered treatment to 15 hyperactive/attention deficit disorder children. Comparisons were made between experimental and control Ss on a number of psychometric and experimental measures including the Matching Familiar Figures Test, subtests from the Wechsler Intelligence Scale for Children, and the Self Control Rating Scale. The direction of improvement in test scores was in favor of the CBM group in all but 2 of the 17 measures used. Differences between the two groups approached statistical significance on five measures. It was concluded that the program did have an effect in the areas which were focused upon, primarily attention and impulsivity. (Author/SW)

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Cognitive-Behavioral Modification with Hyperactive/ Attention Deficit Disorder Children

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Abstract

Cognitive-behavior modification training procedures were taught to special education teachers and elementary school guidance counselors who then administered treatment to a group of hyperactive/attention deficit disorder children. The gains made by this group on a number of psychometric and experimental measures were compared with gains mady by a no-treatment waiting list control group. The direction of improvement was in favor of the CBM group on all but two of the seventeen measures used. Differences between the two groups approached statistical significance on five measures. The authors conclude that the results suggest cautious optimism however much information is needed concerning the effectiveness of cognitive training when conducted by special education teachers and counselors.

Cognitive-Behavioral Modification with Hyperactive/ Attention Deficit Disorder Children

Hyperactive children who experience attention control deficits in the early grades become high risks for academic failure and serious social maladjustment (Minde, Weiss, & Mendleson, 1972, Mendleson, Ackerman, Dykman, & Peters, 1977). The maximum prevalance rate for such children is estimated (Lambert, Sandoval, & Sassone, 1981) to be between 12 to 13% of the school age population. The tempo of research activity has increased steadily since the mid sixties; however, progress in understanding this childhood disorder has been hampered by considerable definitional confusion, problems of measurement, and lack of agreement among representatives of differing theoretical viewpoints.

Three major treatment approaches for working with hyperactive children are physiological, behavioral, and more recently cognitive-behavioral. Physiological treatment has primarily emphasized the use of medication to reduce impulsive behavior while the behavioral and cognitive-behavioral treatments have involved the teaching of cognitive skills and the manipulation of classroom and home environments.

A very general conclusion from the extensive research in this area is that medication, when it is effective, produces a non-specific calming effect while behavior modification tends to affect the

specific behaviors targeted. Undesirable side effects and unpredictable effects of medication on a particular child are often cited as reasons for adopting behavioral strategies. At the same time, both medication and behavior modification represent external control procedures which may well confound the problems of children who already tend to be passive learners.

Cognitive training, which is also called self-instructional training, verbal self-instructional training (VSI), and when it is combined with behavioral strategies cognitive-behavior modification (CBM) represents an increasingly popular alternative to medication and behavior modification. Although the early hope that teaching children to use their own thoughts in the form of self-instructions or self-statements to improve learning and behavior would produce generalized and long lasting changes in both social and academic performance has not been fully realized, the results to date are certainly encouraging. Reviews by Meichenbaum (1977), Meichenbaum and Asarnow (1979), Karoly (1977), and O'Leary and Dubey (1979), provide good overall support for the efficacy of cognitive-behavioral methods.

This study evaluates a cognitive-behavioral treatment program for hyperactive children in which special education teachers and elementary school guidance counselors provided the treatment. An important research question addressed here is the extent to which cognitive-behavioral theory and training can be effectively taught to the professionals (such as teachers and counselors) who will implement

treatment in school settings. A treatment which is highly effective in specialized clinics or university based programs but generally not tenable for use in school settings does not address the needs of children. It may in fact be argued in this vein that treatment availability competes with treatment effectiveness in determining what is actually recommended for a particular child. If CBM could be as palatable and accessible via in depth (but short-term) training, perhaps gains for hyperactive children could be made without such ready use of omnipresent but questionable drugs.

Method

Letters were mailed to twenty-two midwestern schools inviting teachers in grades K-4 to refer children (with the characteristics listed below) to a university summer remedial program.

Subjects

The letter described an upcoming program designed for children with problems such as the following:

> He seems abnormally responsive to everything going on around him.
>
> He just seems to react unselectively without planning.
>
> He pivots in his seat, attends to everything but the lesson and is therefore, the focus of the teacher's permanent reminder to "tend to your own work."
>
> He is an impulsive child who would rather guess than think. If he is wrong, he quickly guesses again.

Phone conversations between the referring teachers and the senior author were used to screen out children who were known or considered

to be mentally retarded or severely emotionally disturbed. Following the telephone discussion with referring teachers, the Conners questionnaire (Conners, 1973) was sent to teachers and parents of all children who fit the description of being impulsive and inattentive. In an attempt to eliminate children with aggressive conduct disorder, the Daily Behavior Checklist (DBC) was sent to the teachers of all children who were rated 1.5 or above on the hyperactivity subscale of the Conner's questionnaire (parent or teacher). This checklist has been shown in a previous study (Prinz, Conner, & Wilson, 1981) to discriminate between hyperactivity and conduct disorder. Teachers rated the children for twelve consecutive school days on eleven hyperactive and eleven aggressive behaviors. If a child was rated as having more overall aggressive than hyperactive behaviors, he was eliminated from the study.

Procedure

Fifteen children were randomly assigned to either a cognitive-behavioral treatment (n-8) or to a waiting list control (n-7). In addition to the Conner's parent and teacher questionnaire and the DBC, the following pre- and post-test measures were used to evaluate the effects of treatment:

(a) Matching Familiar Figures Test (MFFT) (Kagan, 1966). This is a visual matching task requiring the child to select from six similar drawings the one identical to the standard. Latency to first response and total errors are recorded.

(b) Continuous Performance Test (CPT) (Rosvold, 1965). This is a measure of vigilance. The child observes a series of single digits presented at 1 second intervals and signals when he sees a particular combination, e.g., a zero followed by a one. Error of omission (OM) are recorded when the child fails to report the correct combination. Errors of intrusion (IN) are recorded when the child signals an incorrect combination.

(c) Wide Range Achievement Test (WRAT). Spelling, Reading, and Arithmetic.

(d) Subtests from the Wechsler Intelligence Scale for Children-Revised (WISC-R):

-- Arithmetic

-- Digit Span

-- Coding

-- Mazes

The arithmetic, coding, mazes, and digit span subtests of the WISC-R were analyzed separately and also combined as a measure of freedom from distractability.

(e) Ravens Colored Progressive Matricies (1949).

(f) Self Control Rating Scale (SCRC) (Kendall, 1979). This scale contains 33 items to be rated on a 7 point continuum with one word descriptive anchors provided at the extreme of each continuum, e.g., Does the child interrupt conversations or wait his turn--waits (1) interrupts (7).

(g) Children's Embedded Figures Test (CEFT). The CEFT is described by Douglas (1979) as a task on which hyperactives perform poorly. The impulsive tendencies of such children lead them to ignore the embedding context of the figures and respond instead to superficially similar figures.

All twenty children were evaluated in mid June. The 8 children assigned to the CBM treatment were enrolled the following week in a 4 week treatment program consisting of sixteen two-hour sessions. The remaining 7 children were placed on a waiting list control group.

After four weeks, all children in the cognitive training group and the children on the waiting list control were re-evaluated on all pretest measures with the exception of the teacher rating scales.

Teachers for the program consisted of six graduate students enrolled in a practicum course entitled "Psychoeducational Procedures for the Educationally Handicapped." Several of these students were certified special education teachers. All students were interested in acquiring methods for helping children with learning and behavioral problems.

Training for the teachers consisted of four two-hour training sessions. Teachers were provided with a handbook (Understanding and Helping Hyperactive Children: A Handbook for Parents and Teachers) prepared by the senior author. This handbook, written especially for the program, reviews research concerning the nature of attention deficits and impulsivity, the primary dimensions of hyperactive children. Behavioral and cognitive-behavioral treatment procedures are also discussed in considerable detail in the handbook.

In addition to the handbook, teachers were given a copy of the therapist manual developed by Padawer, Zupan, and Kendall (1980) entitled Developing Self-Control in Children: A Manual of Cognitive-Behavioral Strategies. Teachers were also given copies of the Star Training Program developed by Hinshaw, Alkus, Whalen, and Henker (1979). This particular program describes detailed procedures for using cognitive training to improve children's interpersonal skills by teaching self-control and self-regulation. These manuals were provided to give the teachers specific examples of how to conduct a CBM treatment session. They were not used in a "cookbook" fashion. During the teacher training phase, videotapes of an earlier pilot program were viewed and ways of improving the effectiveness of the sessions were discussed. The individual folders of each child were then given to the teachers with one teacher assigned to work with each child. In addition to test results and parent and teacher ratings the folders contained general comments of parents, teachers, and the person who administered the tests. The senior author and two doctoral students in school psychology reviewed the folders with the teachers to outline specific target behaviors and to implement individualized programs matching the cognitive-behavioral treatment to these behaviors.

A response-cost procedure was used to suplement the cognitive training as described in the Zupan et al. manual. Children were given 20 points before each session and were deprived of points contingent upon failure to engage in self-instruction. Points were

also taken away following behaviors such as failure to complete work, talking-out without permission, and not attending to directions.

Once children were able to keep their attention focused through overt verbal self-instruction for fairly long periods of time, they were taught, as the program progressed, to whisper and later to mouth the instructions, in a manner similar to the study by Meichenbaum and Goodman (1971). Once they appeared to be engaging in silent self-monitoring and self-directing of behavior, a technique described by Kneedler and Hallahan (1981) was added. This technique involved the use of a tape recorded bell which rang on the average of every forty-five seconds with a range of from ten seconds to two minutes. Children were asked to place a checkmark in the yes or no column of a strip of paper (taped to the desk) indicating whether or not they were paying attention at the bell.

Teachers were continually urged and reminded to help each child develop self-statements which were functionally related to his or her problem and to encourage natural self-talk rather than rote recitations of such statements as, "what is my problem?" and "what is my plan?". The authors and graduate assistants viewed teachers working with the children through one-way mirrors, and videotapes were made of each day's session. Feedback to teachers was provided whenever it appeared that help was needed, and the teachers met at the end of each week to review tapes and to rate each other for adherence to CBM treatment methods.

During the first week, teachers met individually with the child assigned to them for one hour. This time was spent modeling and teaching the specific self-monitoring and self-instructional skills thought relevant to the child's problem. The second hour was spent with the children working in pairs with one teacher. The focus of the second hour was practicing the skills taught in the preceding hour.

During the second week, the group size was increased from two to four children, again with one teacher monitoring the session. During the third and fourth week the group size was increased to five, and finally all children were placed together in an attempt to provide a situation resembling a regular classroom where the children practiced the cognitive monitoring and self-instruction skills taught in individual sessions.

Insert Table 1 about here

Table 1 summarizes the relationship between the measures used to determine hyperactivity and to evaluate the effectiveness of treatment. In order to eliminate correlation coefficients which might have achieved significance only because of the large number of variables involved, separate analyses of the pretest and posttest scores were performed. Only coefficients which were significant in both analyses were included in table 1. The non-significant correlations were not reported in order to present a better visual

picture of the clusters of test inter-relationships. These clusters for the most part show that measures such as parent ratings, achievement measures, and ability measures are internally consistent. There is, however, a very limited relationship between these measures. Parent ratings of self-control and hyperactivity, for example, do not relate well to psychometric measures of attention. This finding is similar to other findings reported in the literature and supports the conclusion that hyperactivity is not a unitary syndrome (Langhorne, Loney, Paternite, & Bechtoldt, 1976).

Some exceptions to the trend are noteworthy. The parent hyperactivity ratings as well as the parents ratings of their child's self-control correlated with errors of omission on the continuous performance test. The freedom from distractability measure (FD) (derived from the four Wechsler subtests as suggested by Kaufman, 1979) related significantly to reading, spelling, and arithmetic scores. This is especially noteworthy in that FD was shown to improve significantly for the CBM treatment group.

Insert Figure 1 and Table 2 about here

Table 2 presents the pre and post test mean scores for the various measures and compares the gains of the CBM and the waiting list control group. The children in the CBM group gained significantly on 6 of the 20 measures, when the .05 level of

confidence is used; and they gained significantly on 6 additional measures when the confidence level is set at .10.

Two of the measures which showed no significant improvement were the parents ratings of their children's degree of conduct disorder and anxiety. MFFT latency and error scores which were measures thought to be closely related to the treatment goals did not improve significantly as a result of the CBM treatment.

The no-treatment comparison group did not improve significantly on any of the 20 measures when the .05 confidence level was employed. The one measure which changed significantly using this level was the reading scores, but this change represented a decrease rather than an improvement. By using the .10 confidence level, Wechsler arithmetic scores also decreased significantly for the no-treatment group. Scores on spelling and the Children's Embedded Figures Test (CEFT) did improve significantly for the no-treatment group at the .10 level.

Insert Figure 2 about here

Figure 2 compares the gains made by the CBM group with the gains of the no-treatment group. The magnitude of the difference between the gains of the two groups are generally small; however, the gains are greater for the CBM group on all but two measures. These are WRAT spelling and CPT intrusive errors.

One way analysis of variance indicates that the CBM gains were considerably greater than no-treatment gains on five measures. These were parent ratings of self-control ($F = 1.48$, $p<.25$); WRAT Reading ($F = 3.47$, $p<.09$); Wechsler Arithmetic ($F = 2.97$, $p<.11$); Freedom from distractability ($F = 1.71$, $p<.21$); Raven Progressive Matricies ($F = 1.66$, $p<.22$).

SUMMARY AND DISCUSSION

Hyperactivity has been increasingly understood as a disorder involving chronic inattention and impulsivity. The treatment procedures variously described as cognitive training, self-instructional training, and cognitive-behavioral modification have been shown in previous research to offer promise in improving attention and reducing impulsivity among hyperactive children. This research focused on the question: Can the professionals (teachers and counselors) who are responsible for the teaching of hyperactive children be taught effective use of cognitive training procedures?

Fifteen children were randomly assigned to either a cognitive-behavior modification (CBM) group or a no-treatment waiting list control group. Six teachers were assigned to work with the CBM group. Four of the six were experienced special education teachers, and two had had experience as elementary guidance counselors. None of the six were familiar with the CBM treatment or the theory on which it is based.

The teachers received approximately sixteen hours of preparatory training, about half of which was direct instruction and modeling by the senior author. They then worked with the eight children assigned to the CBM group for approximately 30 hours to implement cognitive-behavioral training.

The results of correlated t tests show that the CBM group made significant gains on twelve of the twenty measures employed to evaluate the treatment. The no-treatment group by comparison gained on only two of the twenty measures and lost significantly on two other measures while waiting to enter the program.

A comparison of gain scores for the two groups showed gains approaching statistical significance on five measures. The CBM gains were greater but not statistically significant on all but two measures. These results suggest that the process of attending more carefully to academic task is being affected by the cognitive training. The small magnitude of gains may be related to the rather short duration of the program.

The positive findings of this research are promising in that they suggest that CBM procedures can be taught in a relatively short period of time to the professionals who most need skills in working with hyperactive children. Although many of the scores for the CBM group were only modestly improved, taken as a whole they strongly suggest that the program did have an effect in the areas which were focused upon, namely attention and impulsivity.

It was unexpected that measures thought to be directly related to attention and impulse control such as the MFFT, the CPT, and the Red-Light-Green-Light Test did not reflect gains as well as other measures. The MFFT results were particularly unexpected, because other studies have found this instrument to be sensitive to treatment gains.

The small sample size combined with the modest practical significance of the improvement following the CBM treatment limit the ability of the authors to confidently conclude that CBM is a viable treatment package ready to be delivered to classroom teachers. Among the many unanswered questions are ones concerning how long the treatment effects will last and if and to what extent the behaviors which children are taught in cognitive-behavioral training will transfer to varied classroom settings with varying instructional materials.

In view of the small gains made by the CBM group it does not appear likely that transfer and long term effects will be large. It is possible however that with prompting in the form of booster sessions the skills which children in the CBM group were beginning to acquire may be further developed.

A study is presently underway in which the waiting list control group used for comparison here is receiving a cognitive monitoring combined with response-cost treatment. Should the gains of this group equal or exceed the CBM group, the task of training teachers would be much simplified. Two other studies are in the planning

stage in which all of the children involved in the two studies described above will be monitored in the home and in the classroom in order to promote and then to assess generalization and transfer effects.

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Table 1

Intercorrelations of Measures Used to Evaluate CBM Treatment N = 15

** p < .05
* p < .10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) Age	1.00																				
(2) Conners Hyper.		1.00																			
(3) Conners L.D.		.70	1.00																		
(4) Conners C.D.		.38		1.00																	
(5) Conners Anxiety		.38			1.00																
(6) Self Control Ratings (Kendall)		.71	.38	.41	.45	1.00															
(7) Mff Latency				.39			1.00														
(8) Mff Errors							-.54	1.00													
(9) HRAT (Reading)	-.42						.53	-.54	1.00												
(10) WRAT (Spelling)								-.42	.83	1.00											
(11) WRAT (Arithmetic)									.64	.75	1.00										
(12) Cont. Per. on Ommissions		.60				.41						1.00									
(13) Cont. Per. Inclusions	.41										-.36		1.00								
(14) Red-Green Errors	-.41													1.00							
(15) CEFT											.40				1.00						
(16) WISC-R (Arithmetic)	-.54								.64	.68	.87		-.36		.38	1.00					
(17) WISC-R (Digits)				.55	.42				.64	.66	.52	.60				.60	1.00				
(18) WISC-R (Coding)							.47	-.52	.59	.52	.40					.41		1.00			
(19) WISC-R (Mazes)																	.40		1.00		
(20) Freedom for Distractability	-.38								.76	.76	.72						.77	.74		1.00	
(21) Raven Matrices										.42	.38	-.43								.44	1.00

Table 2

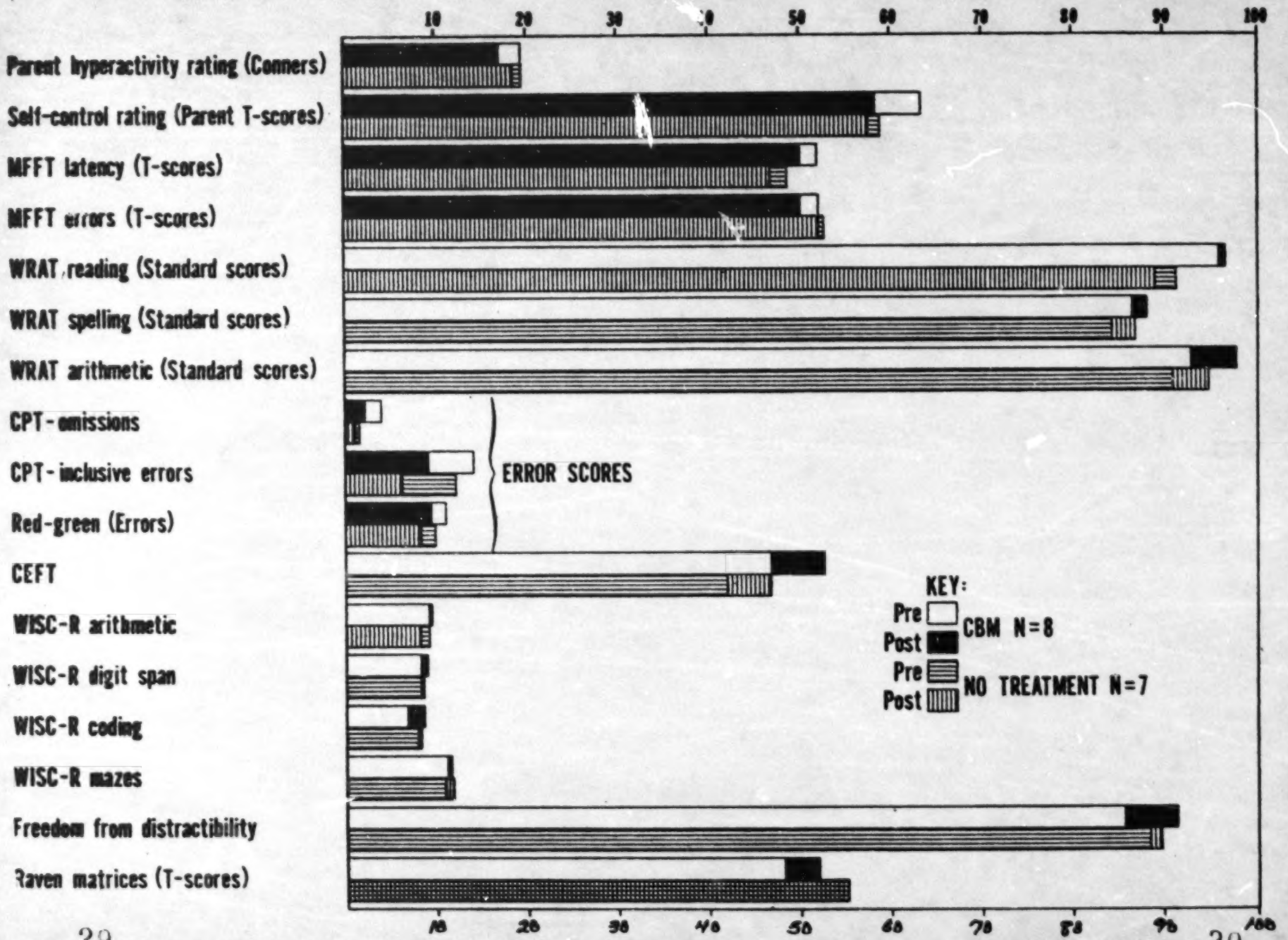
Correlated t-tests Comparing Pre and Post Testing Gains for a CBM vs. a Waiting List Treatment Control

Variable	$\bar{X}$ Pre	$\bar{X}$ Post	t	p	$\bar{X}$ Pre	$\bar{X}$ Post	t	p
Conners hyper	19.1	17.0	1.94	.05	19.6	18.4	.54	N.S.
Conners L.D.	8.4	6.9	1.98	.05	9.3	8.6	.58	N.S.
Conners C.P.	6.6	5.8	1.08	N.S.	3.7	4.9	- .18	N.S.
Conners Anxiety	2.8	2.0	1.4	N.S.	2.3	1.7	.68	N.S.
Self Control (Parents)	175.9	153.6	3.1	.025	158.1	152.9	.75	N.S.
Mff Latency (Seconds)	15.3	12.3	.95	N.S.	11.8	11.2	.68	N.S.
Mff Errors	14.5	13.3	.91	N.S.	16.1	15.6	.15	N.S.
WRAT (Reading)	95.8	96.5	- .61	N.S.	91.1	88.7	2.07	.05 (loss)
WRAT (Spelling)	86.1	87.9	- .62	N.S.	84.	86.6	-1.59	.10
WRAT (Arithmetic)	92.5	97.8	-1.63	.10	90.7	94.6	-1.36	N.S.
Cont. Per. Ommission (Errors)	3.7	2.0	1.6	.10	1.3	.71	.93	N.S.
Cont. Per. Intrusive (Errors)	13.9	8.9	1.42	.10	11.9	6.3	.97	N.S.
Red Light-Green Light (Errors)	10.8	9.1	1.57	.10	9.6	8.0	1.16	N.S.
CEFT	46.5	52.3	-2.79	.025	41.7	46.6	-1.62	.10
WISC-R (Arithmetic)	8.8	9.0	- .55	N.S.	8.9	7.9	1.73	.10 (loss)
WISC-R (Digits)	7.9	8.6	-1.66	.10	8.0	8.1	- .16	N.S.
WISC-R (Coding)	6.6	8.3	-3.26	.01	7.7	7.9	- .10	N.S.
WISC-R (Mazes)	10.9	11.3	- .40	N.S.	10.7	11.4	- .49	N.S.
Freedom from Distractability	85.2	91.0	-3.72	.005	88.1	89.3	- .39	N.S.
Raven Matricies	47.8	51.7	-1.56	.10	54.8	54.8	.05	N.S.

CBM N = 8

No Treatment N = 7

A COMPARISON OF COGNITIVE-BEHAVIORAL TRAINING WITH A NO TREATMENT WAITING-LIST CONTROL GROUP



GAIN SCORE COMPARISONS OF A COGNITIVE-BEHAVIORAL TRAINING PROGRAM WITH A WAITING-LIST CONTROL GROUP